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How do Aesthetics Affect our Ecology?

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Abstract: Beauty is a powerful force that affects both our emotions and our ecological practices, yet aesthetic values remain understated and under-discussed in ecology. Here we invite discussion about the influence of beauty on ecological research by outlining: 1) how aesthetics affect the practice of ecology, and 2) how aesthetics affect the implementation of ecological research on the landscape. The aesthetic sensibilities of ecologists develop through personal experiences and are enriched by professional training, including ecological coursework, fieldwork, research and discussion. Many ecologists choose an ecological career because it offers an opportunity to work in beautiful, natural places. However, these values influence assessments of landscapes as beautiful, sustainable, functioning or threatened. Beauty and concepts of aesthetic preference may have strong influences on the design, implementation and interpretation of ecological studies as well as public perceptions of ecological processes.

Introduction

The beauty of a landscape or organism affects human emotions as well as ecological sensibilities. Aesthetic preferences determine whether landscapes are viewed as beautiful, sustainable or threatened. These preferences have changed through time and

may reflect the public understanding of ecology. We suggest that aesthetic preferences affect design, implementation and interpretation of ecological research. Additionally, communication of ecological research may have a transformative effect on the public perception of nature.

Beauty has always been recognized as a fundamental part of the human experience but, like truth and goodness, beauty is a complex term that resists definition. Among the more persistent descriptions are terms like: a harmony of parts, unity in diversity, complexity, integration, patterns and clarity-qualities readily observable in nature. The French scientist Henri Poincaré (1913:336) wrote:

...the scientist does not study nature because it is useful; he studies it because he delights in it, and he delights in it because it is beautiful. If nature were not beautiful it would not be worth knowing, and if nature were not worth knowing, life would not be worth living.

Emotional responses to beauty range from the pleasing and delightful to the revelatory and euphoric, and such responses are often the fundamental reward for the scientist.

Aesthetic preferences may have played an evolutionary role in the development and the persistence of our species. Lam and Gonzalez-Plaza (this issue) discuss how cultural responses to nature, partially via development of a group aesthetic over time, may have led to the survival of ancestral hominids through a deeper understanding of ecological phenomena and the natural world.

Despite the long relationship between aesthetics and traditional ecological knowledge, there is a surprising lack of conversation about the interplay between the present day ecological sciences and ideas of beauty. There is a broad literature on aesthetic value and nature (Sheppard and Harshaw 2001; Wilson 1984), but there has been little discussion of how aesthetic biases in ecology might influence the way we understand the natural world (but see Kovacs et al. 2004). In this article, we hope to invite discussion about the influence of beauty on ecological research by outlining: 1) how aesthetics affect the practice of ecology, and 2) how aesthetics affect the implementation of ecological research on the landscape.

Ecological Training and Enhanced Aesthetic Sensibilities

We suggest that beauty can affect the professional work of ecologists in two main ways. First, individual experience with natural beauty can motivate ecological interest, and second, ecological training can deepen sensibilities. Scientists are taught to explore the complexity inherent in molecules, cellular interactions and reactions, organismal interrelationships and ecosystem processes, thus adding an additional layer of insight to understanding biological phenomena. Ecologists are taught to value development and change, not just endpoints, and thus commonly attribute beauty to landscapes that may

not be visually attractive to those without similar training (Kosso 2002). For example, the clear green water of the Colorado River is not as beautiful to an ecologist as it would be were it laden with its appropriate red-brown sediments that are retained by the Glen Canyon dam upstream. Additionally, an ecologists perspective could be that a forest cleared of debris, although it looks 'tidy' and organized, will eventually lose wildlife habitat, fertility and productivity, and thus has diminished beauty (Carr and Tait 1991).

Aesthetic Influences on Ecology

How might aesthetic preferences influence ecological research? We suggest that unacknowledged biases are embedded throughout ecological studies, from the design to the interpretation of ecological findings. How often is the location of a field site chosen because it is visually appealing? Is there a correlation between locations we would classify as pristine and those we consider beautiful? We suggest that more often than not, ecologists choose to work in undisturbed wetlands, virgin forests or ungrazed grasslands because of aesthetic preference and a desire to understand pristine systems. The beautiful places chosen as field sites for ecological studies are often remote parts of the landscape and, in the case of national parks or wilderness preserves, protected from development. Thus, the case studies used to define the way the natural world works are based on the ecology of places that, for a variety of reasons, have escaped human ingress. Due to the major human influence on most landscapes, the results of many ecological studies therefore lack the ability to generalize to broader landscapes.

Do ecologists avoid conducting ecological research in places that look ugly? Ecology in urban and human-dominated landscapes has only recently been recognized in the U.S. as an important focus (Pickett 2003:58-72). What has kept ecologists from focusing on the ecology of industrial, urban, suburban and anthropogenically disturbed areas for so long? We postulate that this is partially the result of a consistent beauty bias in ecology that has yielded more studies in beautiful, pristine places than in human-dominated systems.

A beauty bias may continue to affect the practice of ecology throughout a scientist's career and may go beyond site selection and into the debate over objectivity (Farnsworth and Rosovsky 1993; Johnson 1995). For example, value-laden terminology such as pristine, fragile, healthy and balance is abundant in the ecological literature and subjectively affects the interpretation of ecological results (Davis and Slobodkin 2004; Lackey 2001). Additionally, aesthetic preferences for ordered and elegant explanations for ecological phenomena-deemed physics envy-may prevent ecologists from recognizing biological complexity (Forbes et al. 2004).

Ecological Aesthetics and Land Management

The aesthetic preferences of scientists, as well as the lay public, can both facilitate and hinder land management practices. If the public supports ecological work because of its beauty, then implementation of restoration and landscape-scale management practices are made easier (Sheppard et al. 2004). If a proposed management plan has a negative appeal for the public, it will be difficult to execute and could result in public outcry. Land managers often face the choice of working with entrenched preferences or seeking to affect the public's aesthetic preferences through education. Two clear examples of the public's influence on land management decisions concern the role of fire in forests and the conservation of endangered species.

Fire and Forests

Public dislike of recently burned forest landscapes was a major driver in the suppression of fire in forested landscapes, although suppression is now recognized as an ecological disaster (Pyne 2004:19-68). A public aesthetic that views forest fire in a negative light is still present today and can be seen clearly in public responses to large wildfires such as the 1988 Yellowstone fires (Franke 2000; Pyne 2004:81-85). However, a growing recognition of the role of fire in ecosystems is helping to inform and thereby change the public aesthetic assessment of fire. As a result of community workshops, public media coverage of the topic (Jacobson et al. 2001) and environmental education (McCaffrey 2004), fire is beginning to be understood as a positive and necessary component of many forest ecosystems. Just as their training can alter an ecologist's aesthetic preference, effective media and science education programs can alter the public's perception of beauty.

Charismatic vs. Non-Charismatic Fauna: An Aesthetic for the Endangered

Understanding public perceptions of endangered species protection is important because 90% of all federally listed, threatened or endangered species have part of their habitat on non-federal land, and 37-50% depend entirely on private property (Bean and Wilcove 1997; Brook et al. 2003; James 2002). Therefore, public appreciation of these endangered species is crucial for their conservation. For example, if private landowners dislike certain species, such as Preble's jumping meadow mouse (*Zapus hudsonius ssp. preblei*), they are less likely to protect the species on their own land (Brook et al. 2003). A survey on the willingness of the public to participate in conservation programs shows that only 34% of the public would support the conservation of an endangered spider, but 89% were agreeable to protecting bald eagles (Kellert 1980).

The responses of the general public to the conservation of species can be vastly different from those of ecologists (Czech et al. 1998; Kellert 1985). While an ecologist

may find appeal in ecologically important, non-charismatic micro-flora and micro-fauna due to an intimate knowledge of the organism and its interactions (Wilson 1984), the lay public may have different sensitivities. Lam and Gonzalez-Plaza (this issue) might argue that it is the separation between current human societies and non-constructed, natural outdoor environments that has led to the loss of developed aesthetics for a wide variety of natural phenomena. We suggest that communication between scientists and the public is an important strategy for heightening public perceptions of beauty, which can in turn aid in the development of appropriate land management policies. This communication can take multiple forms and, in a few cases, scientists are evoking creative pathways to this discussion. For example, various art forms can serve as a means for communicating ecological concepts to the public, including theatre, visual art, music and multimedia performances (Curds 2003; Nadkarni 2004; Wallen 2003).

Conclusions

Aesthetic preferences strongly influence ecological work and the public's acceptance of land management practices. In fact, aesthetic preference may have affected our behaviors and our understanding of the natural world from ancient times to the present (Lam and Gonzalez-Plaza, this issue). Ecologists and biologists rarely acknowledge the way beauty biases can affect research, and these may be significant and therefore worth discussing. In the public arena, aesthetic preferences have significant implications for how lands are managed, and these preferences are influenced by science education. Ecology-based land management will benefit from a dynamic and evolving understanding of the role that aesthetics plays in the lives of both ecologists and the public. It is important for scientists to recognize the inherent and subtle, yet powerful, persuasion of beauty as it shadows ecological research from conception through interpretation.

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